

**Georgia's Vehicle Miles Traveled  
State Implementation Plan Revision  
for the  
Atlanta 1-Hour Ozone Nonattainment Area**

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## 1.0 INTRODUCTION

Atlanta was originally classified as a "serious" ozone nonattainment area, with an attainment deadline of 1999. Because Atlanta failed to attain the 1-hour ozone national ambient air quality standard (NAAQS) by November 15, 1999, the area was reclassified<sup>1</sup> from a "serious" to a "severe" ozone nonattainment area effective January 1, 2004. In addition to having been required to submit state implementation plan (SIP) revisions meeting requirements for marginal, moderate, and serious ozone nonattainment areas, Georgia is now required to submit plans meeting the additional requirements for areas classified as severe. Section 182(d)(1)(A) of the Clean Air Act as amended in 1990 (CAA) contains three requirements for severe ozone nonattainment areas:

- offset growth in emissions attributable to growth in vehicle miles traveled (VMT);
- select and implement transportation control measures (TCMs) necessary to comply with the periodic emissions reduction requirements of Sections 182(b) and (c); and
- consider TCMs specified in Section 108(f), and implement such TCMs as necessary to demonstrate attainment with the ozone standard.

Of these three additional requirements for severe ozone areas in Section 182(d)(1)(A) of the CAA, the second and third are dealt with in other SIP revisions, as described below:

The second requirement of Section 182(d)(1)(A) is the adoption of TCMs to attain emission reductions in conjunction with the periodic emissions reduction requirements of Sections 182(b) and (c). Those sections of the CAA require serious ozone nonattainment areas to develop a 15% reasonable further progress (RFP) SIP revision that describes how the area would reduce emissions of volatile organic compounds (VOCs) by 15% from 1990 to 1996. The last revision to Georgia's 15% RFP SIP (the 15% Plan) was submitted by the Georgia Environmental Protection Division (EPD) on June 17, 1996, and was approved by EPA<sup>2</sup> effective May 26, 1999. That approval also included the TCMs in the 15% Plan and therefore satisfies the second requirement of Section 182(d)(1)(A).

The third requirement of Section 182(d)(1)(A) is the selection and implementation of TCMs as necessary to demonstrate attainment of the ozone standard. No emission reductions from TCMs were relied upon in the one-hour attainment demonstration for Atlanta. No emission reduction credits have been claimed for the TCMs added to the SIP since the 15% and 9% Plans.

This SIP revision addresses the first part of Section 182(d)(1)(A), which requires severe ozone nonattainment areas to offset increases in emissions of VOCs from growth in VMT. According to the available guidance<sup>3</sup> on this requirement from the U.S. Environmental Protection Agency (EPA):

"The EPA interprets this provision to require that sufficient [transportation control]

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<sup>1</sup> EPA's final rulemaking action was published in the September 26, 2003, Federal Register (68 FR 55469).

<sup>2</sup> (64 FR 20186)

<sup>3</sup> Section III A(5)(d) of EPA's "General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990" (<http://envinfo.com/caain/nonattainment/gp.html>)

measures be adopted so that projected motor vehicle VOC emissions will never be higher during the ozone season in one year than during the ozone season in the year before. When growth in VMT and vehicle trips would otherwise cause a motor vehicle emissions upturn, this upturn must be prevented...This requirement applies to projected emissions in the years between the submission of the SIP revision and the attainment deadline...."

The CAA required ozone nonattainment areas originally classified as severe to submit a VMT SIP revision within two years of enactment of the CAA, i.e., by November 15, 1992, long before this requirement applied to Atlanta. In consultation with EPA Region 4 it was decided that in fulfilling this requirement the EPD would calculate motor vehicle emissions from 1999, the attainment deadline for serious ozone nonattainment areas, through Atlanta's severe attainment year: per the CAA, "as expeditiously as practicable" but no later than 2005. Consistent with Georgia's modeled demonstration of attainment for the Atlanta area, 2004 is the attainment year. Although the CAA requirement only applies to VOC emissions, NO<sub>x</sub> as well as VOC emissions were included in the analysis.

The EPD has performed an analysis of projected highway mobile source emissions for the period 1999 through 2004 for the 13-county Atlanta nonattainment area. The analysis demonstrates that projected motor vehicle VOC and NO<sub>x</sub> emissions will never be higher during the ozone season of any one year than during the ozone season in the preceding year. The analysis projects motor vehicle VOC and NO<sub>x</sub> emissions in the 13-county severe ozone nonattainment area through the attainment year for the area (2004). The nonattainment area includes the counties of Cherokee, Clayton, Cobb, Coweta, DeKalb, Douglas, Fayette, Forsyth, Fulton, Gwinnett, Henry, Paulding, and Rockdale.

For each year from 1999 through 2004, typical summer day highway mobile source emissions inventories were estimated for the 13-county one-hour ozone nonattainment area. These inventories reflect the most recent planning assumptions available and all federal and state mobile source control rules, including enhanced I/M, Stage II vapor recovery, federal tailpipe standards, and low-sulfur low-volatility Georgia gasoline.

With this submittal, the EPD fulfills the VMT SIP requirement of Section 182(d)(1)(A) of the CAA.

## 2.0 COMPONENTS OF ANALYSIS

### 2.1 VMT Growth From 1999 to 2004

Section III A(5)(d) of the General Preamble says that states should project motor vehicle emissions for their VMT SIP revisions in accordance with EPA's "Section 187" guidance.<sup>4</sup> According to part 1.3 of the Section 187 guidance, "EPA has chosen to specify the use of the [Highway Performance Monitoring System] approach in this guidance for purposes of tracking ...VMT... For forecasting VMT, network models were chosen as the best method. Though these models are not considered to be a superior source of historical area-wide VMT...they are considered to be the best predictor of growth factors for VMT forecasts."

For this analysis, the EPD estimated emissions using motor vehicle activity data from two sources. "Actual" VMT obtained from the Georgia Department of Transportation (GDOT) were used where available, i.e., for the years 1999 through 2002, inclusive. The VMT in these "445 reports" are count-based estimates which are reported to Federal Highway Administration (FHWA) each year<sup>5</sup> as part of the Highway Performance Monitoring System (HPMS). The 445 reports are available on this GDOT web page:

[http://www.dot.state.ga.us/dot/plan-prog/transportation\\_data/400reports/index.shtml](http://www.dot.state.ga.us/dot/plan-prog/transportation_data/400reports/index.shtml)

For the years 2003 and 2004, VMT estimates from the Atlanta Regional Commission's (ARC) network-based travel demand model were used to develop growth factors. These growth factors were then applied to 2002 "actual" VMT to obtain projected VMT. The same ARC model used in developing mobile source emissions estimates for Georgia's recently submitted Post-1999 Rate of Progress (ROP) plan was used. This model was substantially revised and enhanced<sup>6</sup> in 2003 and underwent a significant recalibration to Census 2000 data, including updated population and employment estimates that reflect Census results.

Consistent with EPA guidance<sup>7</sup> for ozone nonattainment area emissions inventories, annual average daily vehicle miles traveled (AADVMT) were converted to summer daily vehicle miles traveled (SDVMT) using seasonal adjustment factors obtained from GDOT.

Although motor vehicle emissions inventories for Atlanta's control strategy SIP revisions are now calculated using ARC's link-based emissions estimation procedure,<sup>8</sup> the emissions analyses for this VMT SIP were instead calculated using the inventory methodology<sup>9</sup> described below:

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<sup>4</sup> *Section 187 VMT Forecasting and Tracking Guidance*, US EPA, January 1992

(<http://www.epa.gov/oms/transp/vmttrack/vmtguide.zip>)

<sup>5</sup> A state's HPMS data are required to be submitted annually, by June 15 of the year following the data year, and to represent conditions through December 31 of the data year.

<sup>6</sup> See "Travel Demand Model Enhancements Reflected in Projected Emissions Inventories" in Appendix A of the Post-1999 ROP Plan for details:

[http://www.dnr.state.ga.us/dnr/envIRON/plans\\_files/plans/app\\_a\\_mobile\\_modeling.pdf](http://www.dnr.state.ga.us/dnr/envIRON/plans_files/plans/app_a_mobile_modeling.pdf)

<sup>7</sup> "HPMS-based annual average daily VMT should ...be adjusted for seasonal effects... VMT for ozone non-attainment areas should be adjusted to the summer season..." From Section 3.4.1.3.3 of EPA's "Volume IV" guidance, *Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources*, EPA-420-R-92-009, US EPA, Office of Air and Radiation, Office of Mobile Sources, 1992, <http://www.epa.gov/otaq/invntory/r92009.pdf>.

"[U]se FHWA's Highway Performance Monitoring System (HPMS) roadway classification scheme to group portions of VMT by the functional classification of the roadways on which they occur. This results in 12 subsets of VMT. Within each subset, speed is weighted by VMT to calculate an average speed and emission factor."

## 2.2 Speeds

Due to averaging of speeds, emission inventories developed with VMT-weighted average speeds by functional classification have somewhat different emission totals compared with link-level inventories. Inventories developed with averaged speeds generally result in higher VOC and lower NOx emissions, so direct comparisons between inventories developed using different methodologies are not valid. However, the averaged speeds approach is consistent with Georgia's 1990 Base Year Ozone Emissions Inventory, 15% Plan, and 9% Plan, and with the way the 1999 through 2002 "actual" VMT are grouped.

Speeds used for all years are based on travel demand model loaded networks (with HPMS codes added) obtained from the ARC. Speeds from each link in networks for 2000, 2002, 2004, and 2005 were processed to develop VMT-weighted average speeds by HPMS functional classification. Speeds for 2001 and 2003 were then interpolated. Finally, Microsoft Excel was used to extrapolate 1999 speeds, using a linear best-fit trend, from the 2000 through 2005 speeds. The travel demand model speeds reflect the results of two speed studies conducted in the Atlanta nonattainment area in 2000 and 2001. A report on the 2000 speed study is available here:

[http://www.dnr.state.ga.us/dnr/environ/plans\\_files/plans/Speed\\_Study.pdf](http://www.dnr.state.ga.us/dnr/environ/plans_files/plans/Speed_Study.pdf)

A technical memorandum on the 2001 speed study is available here:

[http://www.dnr.state.ga.us/dnr/environ/plans\\_files/plans/ARC\\_2001\\_pbsj\\_speedstudyTechMemo.pdf](http://www.dnr.state.ga.us/dnr/environ/plans_files/plans/ARC_2001_pbsj_speedstudyTechMemo.pdf)

Table 1 below shows 13-county total SDVMT for the years 1999 through 2004.

**Table 1**  
**13-County Atlanta Area Summer Daily Vehicle Miles Traveled, 1999 to 2004**

<b>Year</b>	<b>SDVMT</b>
1999	118,478,178
2000	121,147,325
2001	123,985,255
2002	125,091,783
2003	128,763,973
2004	132,436,163

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<sup>8</sup> See Appendix A of the Post-1999 ROP Plan for details:

[http://www.dnr.state.ga.us/dnr/environ/plans\\_files/plans/app\\_a\\_mobile\\_modeling.pdf](http://www.dnr.state.ga.us/dnr/environ/plans_files/plans/app_a_mobile_modeling.pdf)

<sup>9</sup> From section 3.3.5.1 of the "Volume IV" guidance.

## 2.3 Control Measures Modeled

The EPD used the MOBILE6.2 model<sup>10</sup> to calculate motor vehicle emission rates reflecting all federal and state mobile source control rules, including enhanced vehicle inspection and maintenance (I/M) on 25-year-old and newer cars and light trucks; a check for catalytic converter tampering and a gas cap pressure test on all subject vehicles; low-sulfur and low (7.0 pounds per square inch) Reid Vapor Pressure gasoline; Stage II gasoline refueling vapor recovery; the Federal Motor Vehicle Control Program, including Tier 1 and (beginning with 2004 models) Tier 2 tailpipe standards; the National Low Emission Vehicle (NLEV) program; and technician training and certification. The same temperature and humidity data, VMT fractions, and local vehicle age distribution used for the Post-1999 ROP Plan were used in the modeling. See Appendix A<sup>11</sup> of the Post-1999 ROP Plan for further discussion of mobile source modeling.

A compressed file containing the complete MOBILE6.2 input files (filename.IN), plus the output (filename.TXT), post-processed output (filename.CSV) and supporting files (filename.D) used in modeling the mobile source emission inventories for this VMT SIP (all these files are in ASCII text format), is available here:

[http://www.dnr.state.ga.us/dnr/enviro/Plans\\_files/Plans/vmt\\_sip\\_mobile\\_files.zip](http://www.dnr.state.ga.us/dnr/enviro/Plans_files/Plans/vmt_sip_mobile_files.zip)

The archive also contains the Excel 97 spreadsheets and workbooks used in developing the mobile source inventories.

## 2.4 Estimated Emissions

Table 2 gives estimated summer day emissions in the Atlanta area for the years of interest. The emission estimates do not include reductions attributable to the Partnership for a Smog-free Georgia (PSG), a voluntary mobile source emission reduction program, or from the TCMs incorporated into Georgia's approved 15% and 9% Plans. Note also that none of these inventories reflect the slight emissions increases attributable to Georgia's senior exemption<sup>12</sup> from vehicle inspection and maintenance, which were assumed to equally affect the totals for each year.

The requirement to offset growth in emissions due to growth in VMT is satisfied by demonstrating no such growth will take place, i.e., that emissions will continue to decline through the attainment year of 2004.

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<sup>10</sup> <http://www.epa.gov/otaq/m6.htm#m60>

<sup>11</sup> [http://www.dnr.state.ga.us/dnr/enviro/Plans\\_files/Plans/app\\_a\\_mobile\\_modeling.pdf](http://www.dnr.state.ga.us/dnr/enviro/Plans_files/Plans/app_a_mobile_modeling.pdf)

<sup>12</sup> See Appendix E of the Post-1999 ROP Plan for details:  
[http://www.dnr.state.ga.us/dnr/enviro/Plans\\_files/Plans/app\\_e\\_senior\\_exemption.pdf](http://www.dnr.state.ga.us/dnr/enviro/Plans_files/Plans/app_e_senior_exemption.pdf)

**Table 2**  
**Estimated Motor Vehicle Emissions in the Atlanta Area**

<b>Year</b>	<b>VOC tons/day</b>	<b>NOx tons/day</b>
1999	211.86	378.65
2000	197.21	370.27
2001	192.16	359.65
2002	181.19	339.73
2003	176.25	328.27
2004	164.25	303.69

As shown in Table 2, estimated motor vehicle emissions of both VOC and NOx decrease through the 2004 attainment year for the Atlanta severe ozone nonattainment area.



### **3.0 CONCLUSION**

This SIP revision has addressed the requirement of Section 182(d)(1)(A) of the CAA that severe ozone nonattainment areas adopt TCMs to offset growth in VOC emissions attributable to growth in VMT. According to EPA's guidance for VMT SIPs, Section III A(5)(d) of the General Preamble, "If projected total motor vehicle emissions during the ozone season in one year are not higher than during the ozone season the year before, given the control measures in the SIP, the VMT offset requirement is satisfied." For each year from 1999 to 2004, typical summer day highway mobile source emissions inventories were estimated for the Atlanta 13-county one-hour ozone nonattainment area. These inventories, which reflect the most recent planning assumptions available and all federal and state mobile source control rules, indicate that motor vehicle emissions of both VOC and NO<sub>x</sub> decrease each year through the 2004 attainment year for the Atlanta severe ozone nonattainment area. Because of this, adoption of TCMs is not required.